

Intestinal Permeability Biomarker Zonulin is Elevated in Healthy Aging.

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Abstract

INTRODUCTION: Increased gut permeability ("leaky gut") has been proposed as a potential contributor to age-related inflammation and gut dysbiosis. However, information on the relationship between a leaky gut and inflammation and physical frailty during aging are limited.

OBJECTIVE: To investigate the hypothesis that an aging-associated leaky gut is linked to the age-related inflammation and frailty.

METHODS: Two cohorts of healthy adults were studied: young (18-30 years old, n = 19) and older (≥70 years old, n = 18). Serum concentrations of the tumor necrosis factor (TNF)-α and interleukin (IL)-6, zonulin (a marker for leaky gut), and high-mobility group box protein (HMGB1, a nuclear protein triggering inflammation) were measured. Correlations of serum levels of zonulin and HMGB1 with strength of plantar flexor muscles and number of steps taken per day were analyzed.

RESULTS: Serum concentration of zonulin and HMGB1 were 22% (P = .005) and 16% (P = .010) higher in the older versus young adults. Serum zonulin was positively associated with concentrations of TNF-α (r = 0.357, P = .032) and IL-6 (r = 0.345, P = .043). Importantly, both zonulin and HMGB1 were negatively correlated with skeletal muscle strength (zonulin: r = -0.332, P = .048; HMGB1: r = -0.383, P = .023), and habitual physical activity (zonulin: r = -0.410, P = .016; HMGB1: r = -0.483, P = .004).

CONCLUSIONS: Serum zonulin was associated with both systemic inflammation and 2 key indices of physical frailty. These data suggest that a leaky gut may play a critical role in the development of age-related inflammation and frailty.

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